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[MTD 8: Copper and Copper Alloys]

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Indian Standard
SPECIFICATION FOR BRASS RODS FOR GENERAL ENGINEERING PURPOSES

Sixth Reprint AUGUST 2006
(Including Amendment Nos. 1 & 2)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 2 *September* 1967

AMENDMENT NO. 1 APRIL 1968

TO

IS : 4170-1967 SPECIFICATION FOR BRASS RODS FOR GENERAL ENGINEERING PURPOSES

Alterations

(*Page* 4, *clause* 4.1, *line* 2) — Delete reference to IS : 4027-1967‡ and the corresponding foot-note marked with double dagger (‡).

(*Page* 7, *clause* B-1.2) — Delete this clause and change the subsequent clause numbers accordingly wherever they appear in the standard.

(SMDC 11)

Printed at Simco Printing Press, Delhi

AMENDMENT NO. 2 JUNE 2004
TO
IS 4170 : 1967 SPECIFICATION FOR BRASS RODS FOR GENERAL ENGINEERING PURPOSES

(*Page* 3, *clause* 2.1, *line* 2) — Substitute 'IS 1387 : 1993†' *for* 'IS : 1387 - 1959†'

(*Page* 3, *footnote marked* '†') — Substitute the following for the existing:

'†General requirements for the supply of metallurgical materials (*second revision*).'

(*Page* 4, *clause* 3.1, *line* 1) — Substitute 'IS 3288 (Part 3) : 1986*' *for* 'IS : 3288 (Part 1) - 1965*'

(*Page* 4, *footnote marked* '*') — Substitute the following for the existing footnote:

'*Glossary of terms relating to copper and copper alloys : Part 3 Wrought forms.

(*Page* 4, *clause* 5.1, *line* 2) —Substitute 'IS 1608 : 1995§' *for* 'IS : 2656 - 1964§'.

(*Page* 4, *footnote marked* ' § ') — Substitute the following for the existing footnote:

'§Mechanical testing of metals — Tensile testing (*second revision*).'

(*Page* 4, *clause* 5.2, *line* 3) — Substitute 'IS 1501 : 2002||' *for* 'IS : 2866 - 1965||'

(*Page* 4, *footnote marked* '||') — Substitute the following for the existing footnote:

'||Method for Vickers hardness test for metallic materials (*third revision*).'

(*Page* 5, *clause* 5.3, *line* 3) — Substitute 'IS 2305 : 1988*' *for* 'IS : 2305 - 1962*'.

(*Page* 5, *footnote marked* '*') — Substitute the following for the existing footnote:

'*Method for mercurous nitrite test for copper and copper alloys (*first revision*).'

Amend No. 2 to IS 4170 : 1967

(*Page* 5, *clause* **5.4**, *line* 3) — Substitute 'IS 1599 : 1985†' *for* 'IS : 3260 - 1965†'.

(*Page* 5, *footnote marked* '†') — Substitute the following for the existing footnote:

'†Method for bend test (*second revision*).'

(*Page* 5, *clause* **7.1**, *lines* 1 *and* 2) — Substitute 'IS 2826 : 1986‡' *for* 'IS : 2826 - 1964‡'.

(*Page* 5, *footnote marked* '‡') — Substitute the following for the existing footnote:

'‡Dimensions and tolerances for copper and copper alloys, rods and bars for general engineering purposes (*third revision*).'

(MTD 8)

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Indian Standard
SPECIFICATION FOR BRASS RODS FOR GENERAL ENGINEERING PURPOSES

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Indian Standard
SPECIFICATION FOR BRASS RODS FOR GENERAL ENGINEERING PURPOSES

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 5 July 1967, after the draft finalized by the Copper and Copper Alloys Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 As the country's engineering industry is fast developing, the quantity of brass rods used in the manufacture of rivets, screws and machined components has increased considerably. Need was therefore felt to formulate an Indian Standard specification for brass rods for general purposes.

0.2.1 This standard, which is one of series of Indian Standards on copper and brass wires and rods, covers the requirements of brass rods used for general engineering purposes, such as the manufacture of rivets and bolts.

0.3 This standard contains a number of clauses in which the purchaser is allowed to exercise an option and also call for agreement between the purchaser and the supplier. The relevant clauses are **5.3**, **6.2**, **7.2**, **9.1**, **B-1.2**, **B-1.3** and **B-2.1** (*see also* Appendix A).

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard covers the requirements of three grades of brass rods, namely, CuZn20, CuZn30 and CuZn40 for general engineering purposes.

2. SUPPLY OF MATERIAL

2.1 The general requirements relating to the supply of material shall conform to IS : 1387-1959†.

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*Rules for rounding off numerical values (*revised*).

†General requirements for the supply of metals and metal products.

3. TERMINOLOGY

3.1 For the purpose of this standard the definitions given in IS : 3288 (Part I)-1965* shall apply.

4. CHEMICAL COMPOSITION

4.1 The material when analysed in accordance with IS : 3685-1966† and IS : 4027-1967‡, shall have the chemical composition given in Table 1.

TABLE 1 CHEMICAL COMPOSITION

CONSTITUENT	CuZn20 PERCENT	CuZn30 PERCENT	CuZn40 PERCENT
(1)	(2)	(3)	(4)
Copper	79 to 81	68 to 72	59 to 62
Lead	0·1, *Max*	0·03, *Max*	0·75, *Max**
Iron	0·05, *Max*	0·05, *Max*	0·1, *Max*
Total other impurities excluding lead	0·3	0·30	0·3
Zinc	Remainder	Remainder	Remainder

*If required, material may be ordered with a maximum antimony content of 0·02 percent. Further, if lead-free material is required lead to be restricted to 0·1 percent.

5. PHYSICAL PROPERTIES

5.1 Tensile Test — The material when tested in accordance with IS : 2654-1964§ shall have the tensile properties given in Table 2.

5.2 Hardness Test — The material shall be subjected to hardness test and shall have hardness values given in Table 2. The hardness shall be determined in accordance with IS : 2866-1965||.

TABLE 2 PHYSICAL PROPERTIES

(*Clauses* 5.1 *and* 5.2)

MINIMUM CROSS SECTIONAL DIMENSION OR DIAMETER mm	CONDITION	TENSILE STRENGTH kgf/mm^2 *Min*			ELONGATION ON $5{\cdot}65\sqrt{A}$ *Min*			HARDNESS HV *Max*		
		CuZn 20	CuZn 30	CuZn 40	CuZn 20	CuZn 30	CuZn 40	CuZn 20	CuZn 30	CuZn 40
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
5 and above	As manufactured	32·0	35·0	35·0	25·0	25·0	25·0	—	100	—
	Annealed	25·0	28·0	28·0	50·0	50·0	30·0	90	90	90

---

*Glossary of terms for copper and copper alloys : Part I General.

†Methods for chemical analysis of brasses.

‡Methods for chemical analysis of bronzes.

§Method for tensile testing of copper and copper alloys.

||Method for vickers hardness test for copper and copper alloys.

5.3 Mercurous Nitrate Test — When required by the purchaser the material in the condition supplied, when tested in accordance with IS : 2305-1962* shall not show any sign of cracking.

5.4 Bend Test — Test pieces selected from rods as in **8.4** shall not crack when bend cold once through the appropriate angles specified in Table 3. The bend test shall be in accordance with Table 3 and IS : 3260-1965†.

TABLE 3 BEND TEST

Alloy Grade (1)	Condition (2)	Angle (3)	Radius (4)
CuZn 40	As Manufactured	75°	*t**
CuZn 20	As Annealed	180°	*t**
CuZn 30	do	180°	*t**
CuZn 40	do	90°	*t**

*Thickness, diameter or width across flat as applicable.

6. FREEDOM FROM DEFECTS

6.1 The rods shall be clean, smooth and free from fins, spills, porosity cracks or other defects and shall be reasonably straight and free from twists.

6.2 Finish — The rods shall be finished by such cold working and annealing operations as would produce the required temper, corner, edge and surface finish as agreed to between the purchaser and the manufacturer.

7. DIMENSIONS AND TOLERANCES

7.1 Sizes — The material shall be supplied in sizes as specified in IS : 2826-1964‡ subject to relevant tolerances also specified in IS : 2826-1964‡.

7.2 Radius on Edges (Square and Polygonal Material) — If the material is required in radiused edges, the radius of curvature shall be agreed to between the purchaser and the manufacturer.

8. PACKING

8.1 The rods shall be supplied in bundles and strapped with hoops and shall be suitably packed to avoid damage during transit.

9. MARKING

9.1 Suitable metallic tags and labels with markings made on them to show the grade, and where applicable, temper of the material in addition to name of the manufacturer, weight and any such information required by the purchaser, shall be attached to each bundle of the material.

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*Method for mercurous nitrate test for copper and copper alloys.

†Method for bend test for copper and copper alloys.

‡Dimensions for wrought copper and copper alloys, rods and bars.

9.2 BIS Certification Marking

The product may also be marked with Standard Mark.

9.2.1 The use of the Standard Mark is governed by the provisions of the Bureau of Indian Standards Act, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

10. SAMPLING AND CRITERIA FOR CONFORMITY

10.1 The method of drawing representative samples of the material and the criteria for conformity shall be as prescribed in Appendix B.

APPENDIX A

(*Clause* 0.3)

INFORMATION TO BE GIVEN BY THE PURCHASER

A-1. The following information shall be given by the purchaser while ordering the material:

a) Whether mercurous nitrate test is required (*see* **5.3**),
b) Condition of finish (*see* **6.2**),
c) If the material required in radiused edges (*see* **7.2**),
d) Marking details (*see* **9**), and
e) Sampling and criteria for conformity (*see* **10**).

APPENDIX B

(*Clause* 10.1)

SAMPLING AND CRITERIA FOR CONFORMITY

B-1. LOT

B-1.1 In any consignment all the rods of the same grade (in chemical composition), size, temper and manufactured by a single firm under essentially similar conditions of production shall be grouped to constitute a lot..

B-1.2 Unless otherwise decided by mutual agreement of the purchaser and supplier, each rod shall be examined from each lot for freedom from defects (*see* **6**) and for tolerances on sizes (*see* **7**). Any rod found defective in accordance with the provisions of **6** and **7** shall be rejected.

B-1.3 Unless otherwise agreed between the purchaser and supplier, each rod shall be examined from each lot for freedom from defects (*see* **6**) and for tolerances on sizes (*see* **7**). Any rod found defective in accordance with the provisions of **6** and **7** shall be rejected.

NOTE 1 — The material required for chemical analysis from each rod intended for testing shall be collected in accordance with IS : 1817-1961*.

NOTE 2 — When the size of the order does not permit grouping in the above quantities, the rate of testing shall be as agreed to between the purchaser and the supplier.

B-1.3.1 If the results as obtained for each of the chemical characteristics satisfy the corresponding requirements under **4**, the lot shall be considered as conforming to the chemical requirements of the specification.

B-1.3.2 If the test results fail to satisfy the requirements for any of the characteristics, two more tests for that characteristics shall be done on the same sample in order to confirm that the analysis has been done properly. If both of the test results satisfy the relevant requirements under **4** the lot shall be considered as conforming to the specification; otherwise not.

B-2. GROUPING

B-2.1 The rods in each lot shall be divided into groups on the basis of weight and size in accordance with Table 4. The sample for physical tests shall consist of one rod for every such group or part thereof.

TABLE 4 GROUP SIZE

MINIMUM CROSS-SECTION DIMENSION OR DIAMETERS		WEIGHT OF EACH GROUP
Over	Up to and Including	
mm	mm	kgf
(1)	(2)	(3)
5	10	250
12	40	500
40	80	1 000
80	—	2 000

NOTE — When the size of the order does not permit grouping in the above quantities, the rate of testing shall be agreed to between the purchaser and the supplier.

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*Methods for sampling non-ferrous metals and chemical analysis.

B-3. CRITERIA FOR CONFORMITY

B-3.1 The lot shall be considered as conforming to the requirements of mercurous nitrate test and bend test, if all the test pieces subjected to these tests satisfy the respective requirements.

B-3.2 The lot shall be considered as conforming to the requirements of tensile strength and elongation and hardness laid down in this specification, if the mean and the range calculated from the test results for each of these characteristics satisfy the conditions given below:

> The value of the expression (Mean + 0·6 range) shall be less than or equal to the corresponding maximum specification limits.
>
> The value of the expression (Mean — 0·6 range) shall be greater than or equal to the corresponding minimum specification limit.

NOTE — In case there are more than 10 test results from a lot, they shall be divided into minimum number of groups of approximately equal sizes not exceeding 10. The criteria given under **B-3** shall then be applied to each such group separately.

B-3.3 When only one test is to be done on a lot for tensile strength and elongation, the lot shall be considered as conforming to the requirement of this specification, if the result so obtained satisfies the requirements specified in Table 2. If the test result fails to satisfy any of these requirements two more tests in respect to each such characteristic shall be done in order to confirm that the test has been done properly. If both of these test results satisfy the requirements given in Table 2, the lot shall be considered as conforming to the requirements of the specification, otherwise not.

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